MOUNTAIN VIEW PLAZA
The Mapping of Utilities

Surv 271

12/16/03

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Abstract
This project was constructed to locate and map the storm sewer, sanitary sewer, and water lines at Mountain View Plaza. Mountain View Plaza (MVP) is located in the NW ¼ of Section 31, T29N, R21W. The map that is created will be useful for future locations of the aforementioned utilities, and the installing of any future developments.

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**Introduction**

The project that I chose to do is the mapping of the Mountain View Plaza (MVP) Utilities. The utilities that are to be mapped are the storm sewer, the sanitary sewer, and the water system. The reason I chose this project was because it goes along very nicely with my job at the Department of Public Works. Hopefully the map that I created will be useful in finding and shooting in utilities that have not yet been shot by the city.

**Methods and Materials**

MVP is located in the NW ¼ of Section 31, T29N, R21W. Local references to MVP are that it is North of Flathead Valley Community College. It falls just South of West Reserve, and just to the East of U.S. Highway 93. The entire area of the plaza is 59.08 acres.

The time frame that I came up with for this project was as follows:
- Planning - 5 hours
- Shooting - 10 hours
- Correction – 4 hours
- Building of Maps – 5 hours
- Building Presentation – 5 hours

For this project I used a GeoExplorer 3. Trimble says the accuracy level of this equipment is 3-5 meters. Because of test that we have ran in class I would say that Trimble’s accuracy level is correct. This level of accuracy is definitely within the limits that we need for a mapping project.

After choosing the project and the equipment I had to build a data dictionary. Basically what a data dictionary does is help you to organize the shots that you are taking. You tell the machine if the feature is going to be a point, line, or area. You also can give features attributes and basically just make a description of the point that you are going to be shooting. A good data dictionary will save you a tremendous amount of work. This is the data dictionary that I prepared for this project.

<table>
<thead>
<tr>
<th>FEATURES</th>
<th>TYPE_</th>
<th>ATTRIBUTE_</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>STORM</td>
<td>POINT</td>
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<tr>
<td>STORM</td>
<td>CURB DRAIN</td>
<td></td>
</tr>
<tr>
<td>WATER</td>
<td>POINT</td>
<td>HYDRANT</td>
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<tr>
<td>WATER</td>
<td>VALVE</td>
<td></td>
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<tr>
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<td>AREA</td>
<td>OUTER EDGE</td>
</tr>
<tr>
<td>BPA TOWER</td>
<td>POINT</td>
<td>MIDDLE OF TOWER</td>
</tr>
<tr>
<td>BPA LINE</td>
<td>LINE</td>
<td>MIDDLE OF LINE</td>
</tr>
<tr>
<td>CHECK</td>
<td>POINT</td>
<td>NAIL</td>
</tr>
</tbody>
</table>
Before I could go out and gather information, I had to do a bit of planning. The following graphs and explanations will help you see what I was planning for.

### Number of Satellites

[Graph showing number of satellites over time]

The **number of satellites** chart simply shows you how many satellites will be visible to you at any given time. This is important because you always want to be receiving information from at least five satellites. So you look at your chart and make sure that you are not going out and collecting data at a time when you only have four satellites available.

### PDOP

[Graph showing PDOP levels over time]

The **PDOP** chart simply tells you what your PDOP level is at any given time. You want your PDOP to be under 4. So you look at your PDOP chart to see at what time your PDOP will be under 4, and then hopefully there is a corresponding time where you will have a healthy number of satellites. The following are the number of satellites and the PDOP levels I had at the times that I went out and shot my data.

- **12/02 9 – 12 p.m.**
- **12/03 8 – 10:30 p.m.**
- **12/04 11 – 11:45 a.m.**

After the planning stage was over it was time to take out the GeoExplorer and shoot in some data.

Just using the GeoExplorer to gather information is not enough. I had to be able to take that information and correct it. After correction I then had to be able to place my information on maps so that I could convey the results of my project to the class and have them understand what I was talking about.
As soon as I had gathered my data I hooked up the GeoExplorer to the computer and downloaded my data using Pathfinder Office. In Pathfinder Office I was able to differentially correct my data. To do this I used the Forest Service base station out of Missoula. I then exported my data out of Pathfinder Office and into Arcview.

By using Arcview I was able to overlay my information on top of an orthoquad. Doing this gives the viewer a pretty good idea of where you are in accordance with features on the ground such as rivers and highways.

From Pathfinder Office I also exported my data as a dxf. file so that I could work with my information in AutoCAD. I did most of my massaging and map building in AutoCAD for two reasons. The first being that I believe an AutoCAD drawing is very easy to look at and understand, and the second being that I feel very comfortable working with the program.

Results and Discussion

The final map that was produced out of this project turned out to be pretty good one. The map is easy to understand, and judging by the way it lined up with Josh Lenderman’s map I believe that it is also a very accurate one.

At this point I would like to talk about some of the problems I had during the process of making these maps. Unfortunately I didn’t have any. Everything went together very smoothly for me. I didn’t have any problems with the collection of data, the transferring of data, or the making of any of my maps. I was very pleased at how easily things went together.

The following are pictures of the raw data that I shot, the data after correction, my final Arcview map.

**Uncorrected Data**

**Corrected**

**Final Arcview Map**

The following page will have what I think of as the final map. It was created in AutoCAD. It follows the rules that the city would use in making a map as far as the color system goes. Anything that is orange is part of the sanitary sewer system, green is storm sewer system, and blue is the water system.
Conclusion and Recommendations

I believe the project was a successful one. I will be using the maps that I created to help in the location of the utilities for the city. Some of the points that I found have yet to be mapped by the city, and the maps that I have created should be useful in the location of these points.

Here are some recommendations that I would have to anyone who in the future will be doing a project similar to this. Start as soon as possible. As soon as you are told about the project start the planning process. Pick something that is complex enough to meet the requirements, yet simple enough so that you don’t have 80 hours into two credit class. Also I would recommend finishing the entire project at least a week ahead of time. You have no idea how much stress you will save yourself by getting done ahead of schedule.

Thanks

I would like to thank the following people for their efforts in helping me complete this project.

Greg Thurston for helping me obtain information that the city had on file.
Josh Lenderman for helping with the planning process, as well as working with me on the combination of our maps
Dave Dorsett for the use of his digital camera, and for helping me with the exporting of my AutoCAD drawings into my Power Point presentation.